

upper lake region, 88.7; Tennessee and the Ohio valley, 90.7; upper Mississippi valley, 90.0; lower Missouri valley, 86.5; northern Pacific coast region, 83.3; middle Pacific coast region, 90.3; southern Pacific coast region, 90.3.

There were 50 omissions to predict (13 being due to the absence of reports from the Pacific coast) out of 3,813, or 1.31 per cent. Of the 3,763 predictions that have been made, 29, or 0.77 per cent., are considered to have entirely failed; 64, or 1.70 per cent., were one-fourth verified; 232, or 6.17 per cent., were one-half verified; 645, or 17.14 per cent., were three-fourths verified; 2,793, or 74.22 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

Seven cautionary signals were displayed during the month of July, of which the total number, or 100 per cent, were justified by winds of twenty-five miles per hour, at or within one hundred miles of the station. No off-shore signals were displayed.

One-hundred and fifteen winds of twenty-five miles, or more, per hour, were reported, for which no signals were ordered; many of these were local storms or strong sea-breezes, for which no signals were required. One Signal was reported late.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the table on the right-hand of chart number iii., are given the highest and lowest stages of water observed at Signal Service stations during the month of July, 1882. In the first column of this table are given the heights of water on the gauge, which have been dangerous to property at stations.

The upper Mississippi river, from Keokuk to Cairo, reached its highest stage between the 1st and 9th. At the former station, on the 1st, the water rose to fifteen feet and seven inches, or thirteen inches above the danger line. At Saint Louis, the highest water, thirty-two feet and five inches, or twenty-five inches above the danger line, occurred on the 5th. On the 8th and 9th, at Cairo, the water rose to within fourteen inches of the danger line. At Vicksburg, the river continued falling throughout the month. The water remained at the danger line on the 1st and 2d; and at the close of the month was five feet and nine inches below the danger line. The highest water in the Missouri river occurred from the 1st to the 3d; and in the Ohio river, from the 1st to the 8th.

FLOODS.

Missouri: Kansas City, 2d, the Missouri river overflowed its banks and completely flooded the surrounding country, doing severe damage to crops. In many places farmers left their homes, fearing a general washout. The damage to crops is estimated at \$50,000. Protem, 3d, heavy rains caused an overflow in Bear and Bee creeks, Boone county. A thickly settled farming region was flooded; fields of corn and cotton were destroyed, fences swept away, and a quantity of shocked wheat was seriously damaged. 8th, a creek about twenty miles south of Protem overflowed from the effects of a heavy rain; horses, cattle and crops were swept away and lost.

Saint Louis, during the 3d, 4th and 5th the Mississippi river was from one foot, six inches to two feet, five inches above the danger-line. Large tracts of bottom-lands were submerged, and lumber-yards and other property along the river suffered considerable damage. The damage to crops is estimated at \$20,000.

Saint Joseph, 18th, heavy rains caused damaging floods, which swept away many small buildings, and caused damage to sewers and other city property to the amount of \$5,000. Much damage also occurred to shocked wheat and to the oat crop, which was ready to harvest.

Ohio: Lebanon, 10th, a flood in Turtle creek caused damage to four houses situated on the banks of the creek, and the furniture was swept away and lost. Columbus, 10th, during a

heavy rain-storm cellars in the northern part of the city were flooded.

Illinois: Alton, 1st, a rise in the Mississippi river caused floods in bottom lands, and ruined many fields of wheat. Several buildings near the river front were damaged.

New York: New York City, 5th, a heavy rain storm flooded the streets and cellars in some sections of the city.

Massachusetts: Boston, 19th, the basements of many houses were flooded during a very heavy rain storm on the afternoon of the above date.

Texas: Coleman City, 9th, a heavy rain caused the creek to rise fifteen feet; bottom-lands were flooded and fences carried away; vegetable crops were much damaged.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at Signal Service stations, with the average depth at which observations were taken, is given in the table on the right-hand of chart number ii. In the first column of the table is given the maximum temperature observed during the month; and in the second column the minimum temperature observed during the same period.

The following table gives the highest and lowest temperature of water at the several stations, with the range of water temperature, mean temperature of the air at the station, and the depth of water at which the observations were taken. It will be seen that the greatest ranges are as follows: 18° at Chincoteague; 17° at New Haven; 15° at Newport; 15° at Duluth. The smallest are: 3° at Port Eads; 4° at Smithville; 4° at Savannah; 5° at Baltimore:

Temperature of Water for July, 1882.

STATION.	Temperature at bottom.		Range.	Average depth in feet and inches.	Mean temperature of the air at station.
	Max.	Min.			
Atlantic City.....	74.5	64.8	9.7	6 9	73.3
Alpena.....	71.8	60.8	11.0	12 0	63.9
Augusta.....	87.5	78.8	9.0	6 0	79.2
Baltimore.....	80.5	75.5	5.0	9 10	76.6
Block Island.....	67.9	67.9	10.0	8 9	69.9
Boston.....	69.	60.6	8.5	25 0	71.7
Buffalo.....	74.7	64.7	10.0	10 0	67.3
Burlington.....	76.	61.3	14.7	19 0
Cedar Keys.....	86.	80.	6.0	10 1	81.5
Charleston.....	84.9	78.7	6.2	40 6	81.3
Chicago.....	69.5	61.4	8.1	7 10	68.6
Chincoteague.....	86.	68.	18.0	6 0	74.2
Cleveland.....	77.	67.5	9.5	14 0	68.7
Detroit.....	73.	66.	7.0	24 0	70.1
Duluth.....	60.	46.	15.0	14 3	61.9
Delaware Breakwater.....	73.3	61.5	11.8	6 6	72.6
Eastport.....	48.2	42.9	5.3	18 2	61.6
Escondido.....	69.	59.6	9.5	15 0	64.6
Galveston.....	86.	78.	8.0	14 6	82.9
Grand Haven.....	78.5	66.6	7.0	19 0	66.5
Indianola.....	66.8	82.4	4.4	9 3	83.0
Jacksonville.....	88.	82.	6.0	18 0	80.9
Key West.....	90.2	82.8	7.4	15 9	85.0
Marquette.....	67.8	51.9	5.9	10 6	62.9
Milwaukee.....	63.5	49.5	14.0	8 0	66.0
Mobile.....	86.3	79.	7.3	15 9	78.6
New Haven.....	79.8	62.5	17.3	15 2	71.6
New London.....	71.	59.	12.0	12 4	71.2
Newport.....	72.4	56.7	15.7	12 0	70.0
New York.....	76.5	65.	11.5	21 7	78.8
Norfolk.....	84.	75.	9.0	16 11	77.9
Pensacola.....	83.	79.8	3.2	17 9	78.5
Portland, Me.....	61.5	61.	10.5	18 10	71.4
Portland, Oreg.....	71.5	62.2	9.3	74 8	65.3
Port Eads.....	82.	79.	3.0	9 7	80.4
Provincetown.....
Punta Rasa.....	80.	83.	7.0	11 10	80.4
Sandusky.....	76.8	68.	8.8	10 0	70.2
Sandy Hook.....	74.3	65.3	9.0	1 7	75.0
San Francisco.....	63.6	57.6	6.0	30 7	58.4
Savannah.....	86.2	81.8	4.4	13 1	81.5
Smithville.....	84.	80.	4.0	10 0	79.3
Thatcher's Island.....	68.7	56.	12.7	7 0	68.3
Toledo.....	78.5	69.5	9.0	11 11	71.8
Wilmington.....	86.5	80.5	6.0	13 0	78.0

*Observations wanting, from 1st to 26th, inclusive.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The most important display of the month occurred on the evening of the 16th. It was observed from Eastport Maine,